Apprenticeship and Industry Training

Glazier

Apprenticeship Course Outline

2514 (2014)

Alberta

Apprenticeship and Industry Training

ALBERTA INNOVATION AND ADVANCED EDUCATION

Glazier: apprenticeship course outline

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Glazier
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Apprenticeship

Apprenticeship is post-secondary education with a difference. Apprenticeship begins with finding an employer. Employers hire apprentices, pay their wages and provide on-the-job training and work experience. Approximately 80 per cent of an apprentice's time is spent on the job under the supervision of a certified journeyperson or qualified tradesperson. The other 20 per cent involves technical training provided at, or through, a post-secondary institution – usually a college or technical institute.

To become certified journeypersons, apprentices must learn theory and skills, and they must pass examinations. Requirements for certification—including the content and delivery of technical training—are developed and updated by the Alberta Apprenticeship and Industry Training Board on the recommendation of Glazier Provincial Apprenticeship Committee.

The graduate of the Glazier apprenticeship program is a certified journeyperson who will be able to:

- be skilful in cutting, preparing, fabricating or other handling of all glass materials for buildings, fixtures and other uses
- do the glazing, setting, attachment, installation, removal of all types of glass material for buildings, fixtures and other uses
- be capable of doing the installation, fitting fabrication and attachment of architectural metals or related products for all types of buildings
- use efficiently and safely all hand and power operated equipment used by tradespeople
- be able to produce from blueprints and working drawings the type of products made and use by the industry
- relate to the work of other tradesmen in affiliated trades
- carry out damaged light removal procedures, installations and sealing of new parts - understand use of specialised tools, lubricants and sealants
- understand and be able to use the National Auto Glass Specifications Parts Book including identification and selection of bent glass parts - heat treated or laminated - cutting and edgework procedures for laminated flat glass to N.A.G. specifications
- perform assigned tasks in accordance with quality and production standards required by industry

Apprenticeship and Industry Training System

Industry-Driven

Alberta's apprenticeship and industry training system is an industry-driven system that ensures a highly skilled, internationally competitive workforce in more than 50 designated trades and occupations. This workforce supports the economic progress of Alberta and its competitive role in the global market. Industry (employers and employees) establishes training and certification standards and provides direction to the system through an industry committee network and the Alberta Apprenticeship and Industry Training Board. The Alberta government provides the legislative framework and administrative support for the apprenticeship and industry training system.

Alberta Apprenticeship and Industry Training Board

The Alberta Apprenticeship and Industry Training Board provides a leadership role in developing Alberta's highly skilled and trained workforce. The board's primary responsibility is to establish the standards and requirements for training and certification in programs under the Apprenticeship and Industry Training Act. The board also provides advice to the Minister of Advanced Education on the needs of Alberta's labour market for skilled and trained workers, and the designation of trades and occupations.

The thirteen-member board consists of a chair, eight members representing trades and four members representing other industries. There are equal numbers of employer and employee representatives.

Industry Committee Network

Alberta's apprenticeship and industry training system relies on a network of industry committees, including local and provincial apprenticeship committees in the designated trades, and occupational committees in the designated occupations. The network also includes other committees such as provisional committees that are established before the designation of a new trade or occupation comes into effect. All trade committees are composed of equal numbers of employer and employee representatives. The industry committee network is the foundation of Alberta's apprenticeship and industry training system.

Local Apprenticeship Committees (LAC)

Wherever there is activity in a trade, the board can set up a local apprenticeship committee. The board appoints equal numbers of employee and employer representatives for terms of up to three years. The committee appoints a member as presiding officer. Local apprenticeship committees:

- monitor apprenticeship programs and the progress of apprentices in their trade, at the local level
- make recommendations to their trade's provincial apprenticeship committee (PAC) about apprenticeship and certification in their trade
- promote apprenticeship programs and training and the pursuit of careers in their trade
- make recommendations to the board about the appointment of members to their trade's PAC
- help settle certain kinds of disagreements between apprentices and their employers
- carry out functions assigned by their trade's PAC or the board

Provincial Apprenticeship Committees (PAC)

The board establishes a provincial apprenticeship committee for each trade. It appoints an equal number of employer and employee representatives, and, on the PAC's recommendation, a presiding officer - each for a maximum of two terms of up to three years. Most PACs have nine members but can have as many as twenty-one. Provincial apprenticeship committees:

- Make recommendations to the board about:
    - standards and requirements for training and certification in their trade
    - courses and examinations in their trade
    - apprenticeship and certification
    - designation of trades and occupations
    - regulations and orders under the Apprenticeship and Industry Training Act
- monitor the activities of local apprenticeship committees in their trade
- determine whether training of various kinds is equivalent to training provided in an apprenticeship program in their trade
- promote apprenticeship programs and training and the pursuit of careers in their trade
- consult with other committees under the Apprenticeship and Industry Training Act about apprenticeship programs, training and certification and facilitate cooperation between different trades and occupations
- consult with organizations, associations and people who have an interest in their trade and with employers and employees in their trade
- may participate in resolving certain disagreements between employers and employees
- carry out functions assigned by the board

Glazier PAC Members at the Time of Publication

Mr. J. Brady	Calgary	Presiding Officer
Mr. B. Denholm	Calgary	Employer
Mr. R. Neal	Calgary	Employer
Mr. R. Walder	Calgary	Employer
Mr. M. Huston	Chestermere	Employee
Mr. B. Simpson	Calgary	Employee
Mr. B. Stadnyk	Edmonton	Employee

Alberta Government

Alberta Advanced Education works with industry, employer and employee organizations and technical training providers to:

- facilitate industry's development and maintenance of training and certification standards
- provide registration and counselling services to apprentices and employers
- coordinate technical training in collaboration with training providers
- certify apprentices and others who meet industry standards

Technical Institutes and Colleges

The technical institutes and colleges are key participants in Alberta's apprenticeship and industry training system. They work with the board, industry committees and Alberta Advanced Education to enhance access and responsiveness to industry needs through the delivery of the technical training component of apprenticeship programs. They develop lesson plans from the course outlines established by industry and provide technical training to apprentices.

Apprenticeship Safety

Safe working procedures and conditions, incident/injury prevention, and the preservation of health are of primary importance in apprenticeship programs in Alberta. These responsibilities are shared and require the joint efforts of government, employers, employees, apprentices and the public. Therefore, it is imperative that all parties are aware of circumstances that may lead to injury or harm.

Safe learning experiences and healthy environments can be created by controlling the variables and behaviours that may contribute to or cause an incident or injury. By practicing a safe and healthy attitude, everyone can enjoy the benefit of an incident and injury free environment.

Alberta Apprenticeship and Industry Training Board Safety Policy

The Alberta Apprenticeship and Industry Training Board (board) fully supports safe learning and working environments and emphasizes the importance of safety awareness and education throughout apprenticeship training- in both on-the- job training and technical training. The board also recognizes that safety awareness and education begins on the first day of on-the-job training and thereby is the initial and ongoing responsibility of the employer and the apprentice as required under workplace health and safety training. However the board encourages that safe workplace behaviour is modeled not only during on-the-job training but also during all aspects of technical training, in particular, shop or lab instruction. Therefore the board recognizes that safety awareness and training in apprenticeship technical training reinforces, but does not replace, employer safety training that is required under workplace health and safety legislation.

The board has established a policy with respect to safety awareness and training:

> **The board promotes and supports safe workplaces, which embody a culture of safety for all apprentices, employers and employees. Employer required safety training is the responsibility of the employer and the apprentice, as required under legislation other than the *Apprenticeship and Industry Training Act.***

The board's complete document on its 'Apprenticeship Safety Training Policy' is available at www.tradesecrets.alberta.ca; access the website and conduct a search for 'safety training policy'.

Implementation of the policy includes three common safety learning outcomes and objectives for all trade course outlines. These common learning outcomes ensure that each course outline utilizes common language consistent with workplace health and safety terminology. Under the title of 'Standard Workplace Safety', this first section of each trade course outline enables the delivery of generic safety training; technical training providers will provide trade specific examples related to the content delivery of course outline safety training.

Occupational Health and Safety

A tradesperson is often exposed to more hazards than any other person in the work force and therefore should be familiar with and apply the Occupational Health and Safety Act, Regulations and Code when dealing with personal safety and the special safety rules that apply to all daily tasks.

Occupational Health and Safety (a division of Alberta Human Services) conducts periodic inspections of workplaces to ensure that safety regulations for industry are being observed.

Additional information is available at www.humanservices.alberta.ca

Technical Training

Apprenticeship technical training is delivered by the technical institutes and many colleges in the public post-secondary system throughout Alberta. The colleges and institutes are committed to delivering the technical training component of Alberta apprenticeship programs in a safe, efficient and effective manner. All training providers place great emphasis on safe technical practices that complement safe workplace practices and help to develop a skilled, safe workforce.

The following institutions deliver Glazier apprenticeship technical training:

Southern Alberta Institute of Technology (Main Campus)

Procedures for Recommending Revisions to the Course Outline

Advanced Education has prepared this course outline in partnership with the Glazier Provincial Apprenticeship Committee.

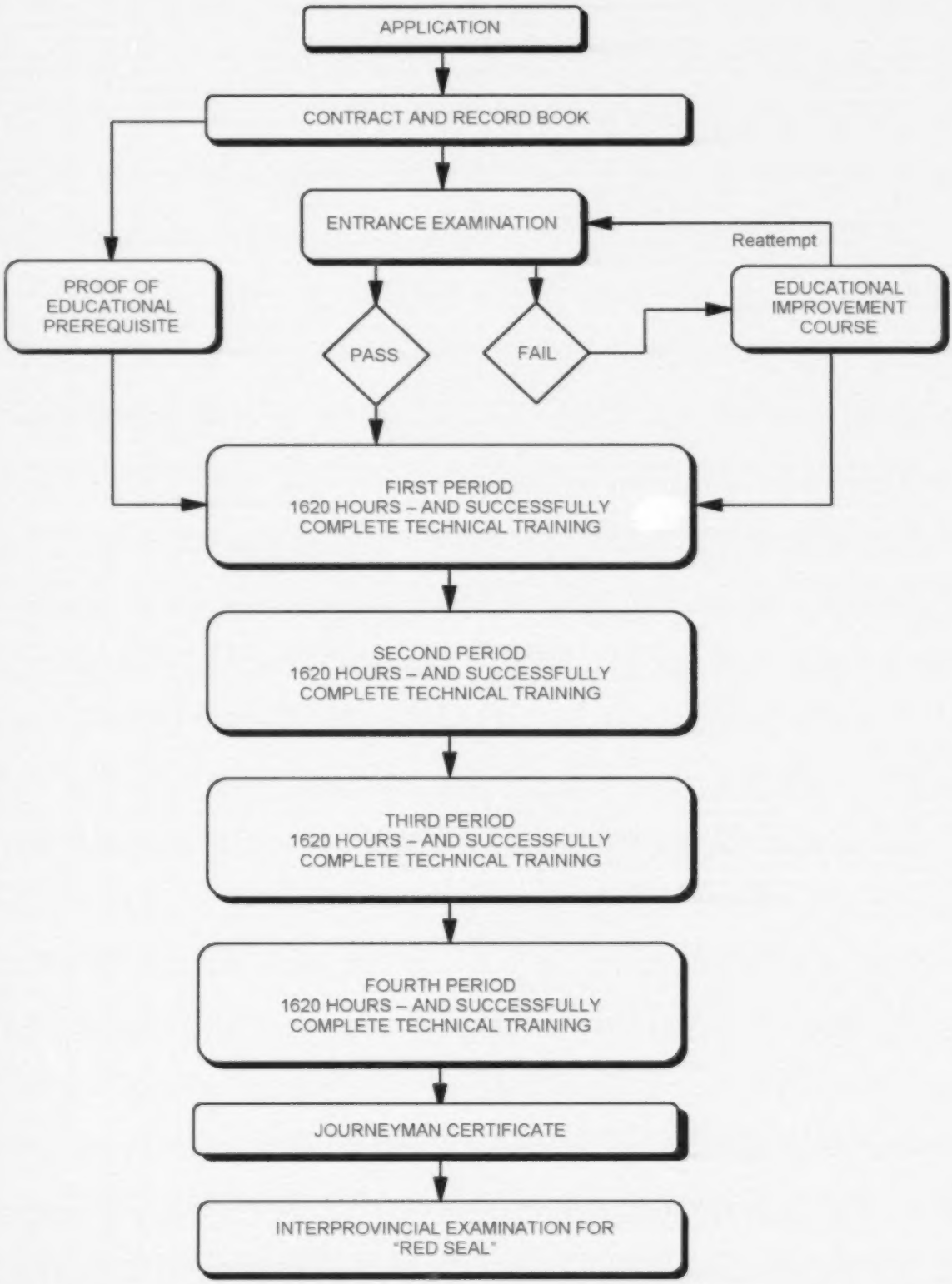
This course outline was approved on December 13, 2013 by the Alberta Apprenticeship and Industry Training Board on a recommendation from the Provincial Apprenticeship Committee. The valuable input provided by representatives of industry and the institutions that provide the technical training is acknowledged.

Any concerned individual or group in the province of Alberta may make recommendations for change by writing to:

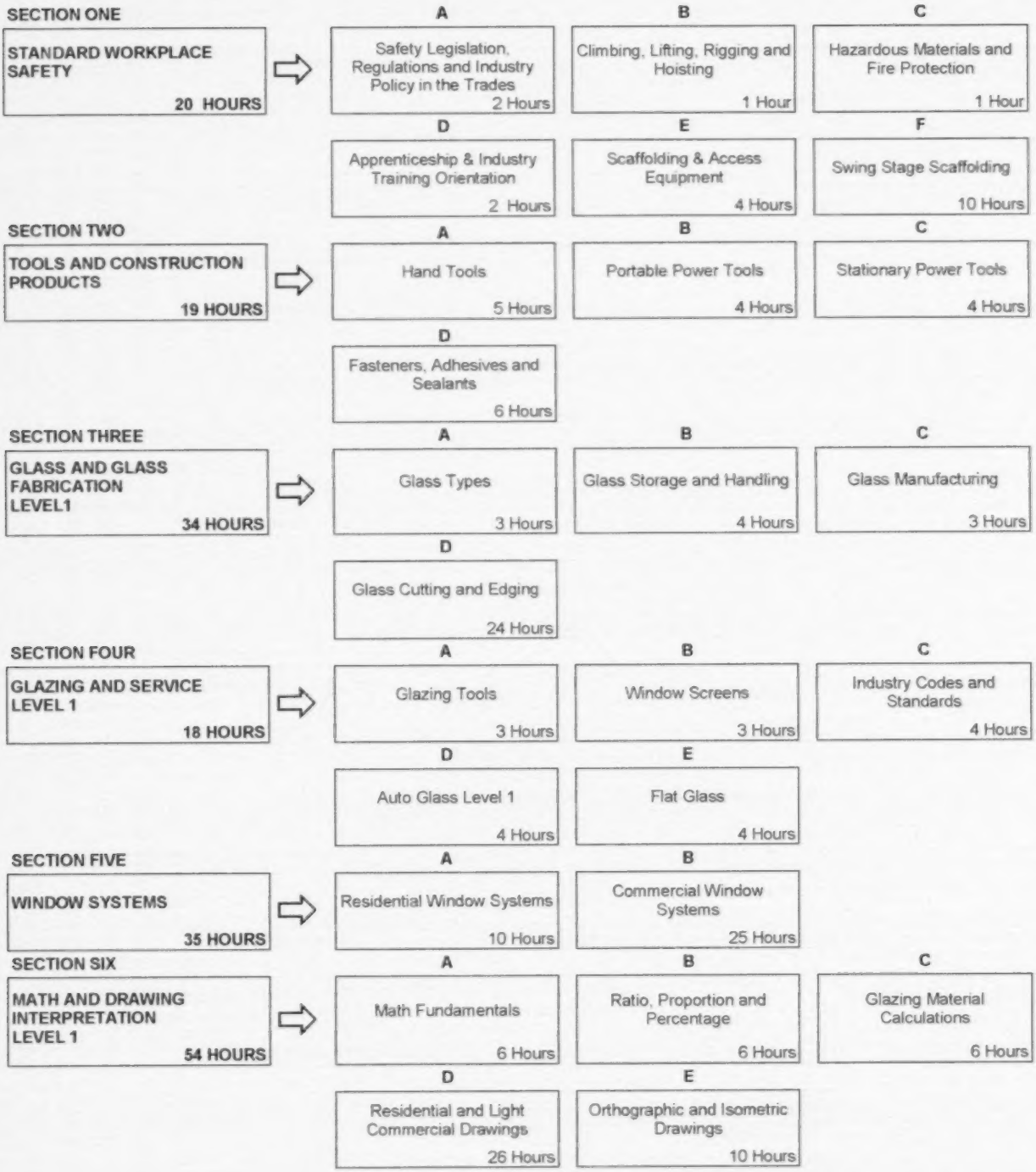
Glazier Provincial Apprenticeship Committee
c/o Industry Programs and Standards
Apprenticeship and Industry Training
Advanced Education
10th floor, Commerce Place
10155 102 Street NW
Edmonton AB T5J 4L5

It is requested that recommendations for change refer to specific areas and state references used. Recommendations for change will be placed on the agenda for regular meetings of the Glazier Provincial Apprenticeship Committee.

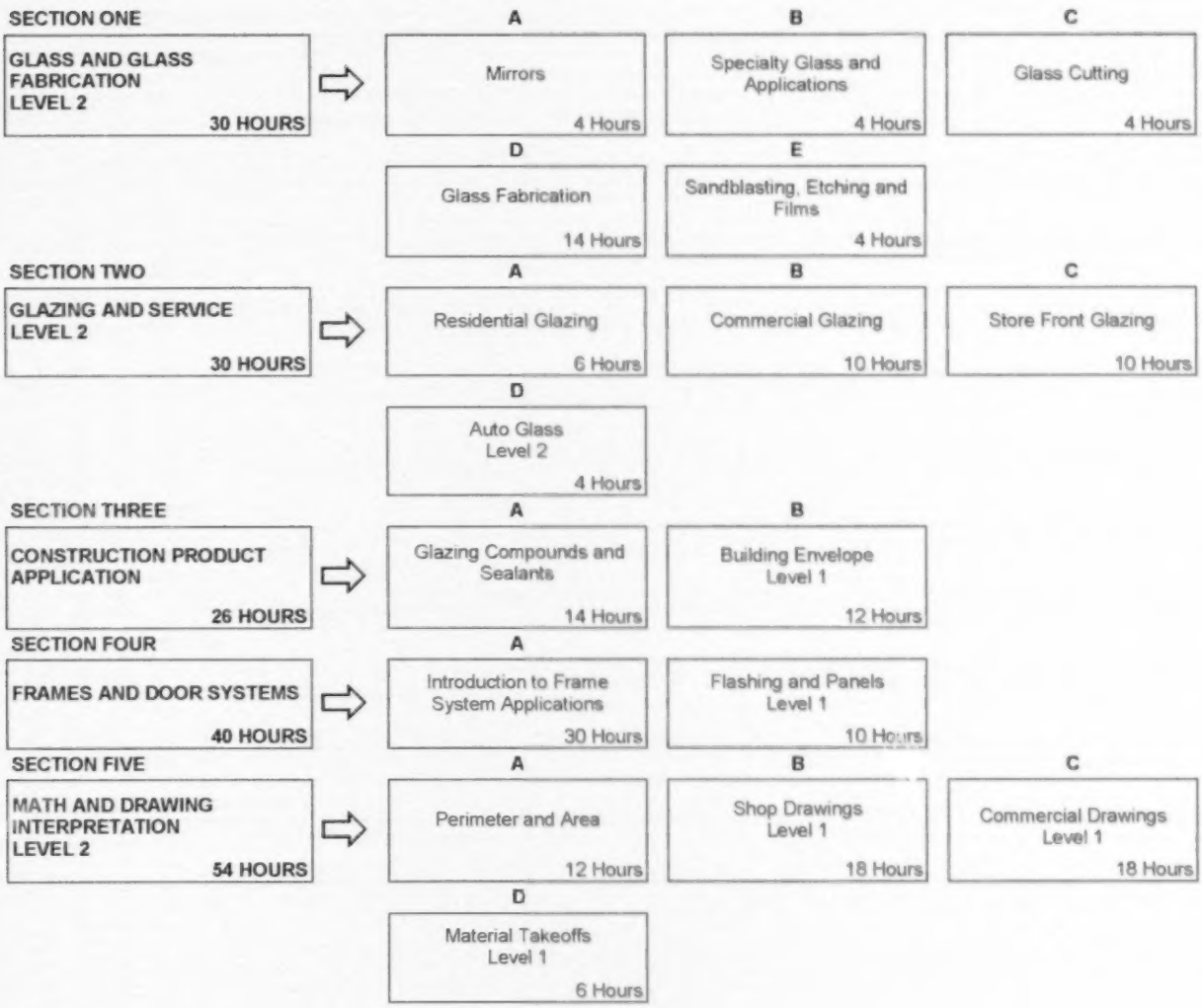
Apprenticeship Route toward Certification



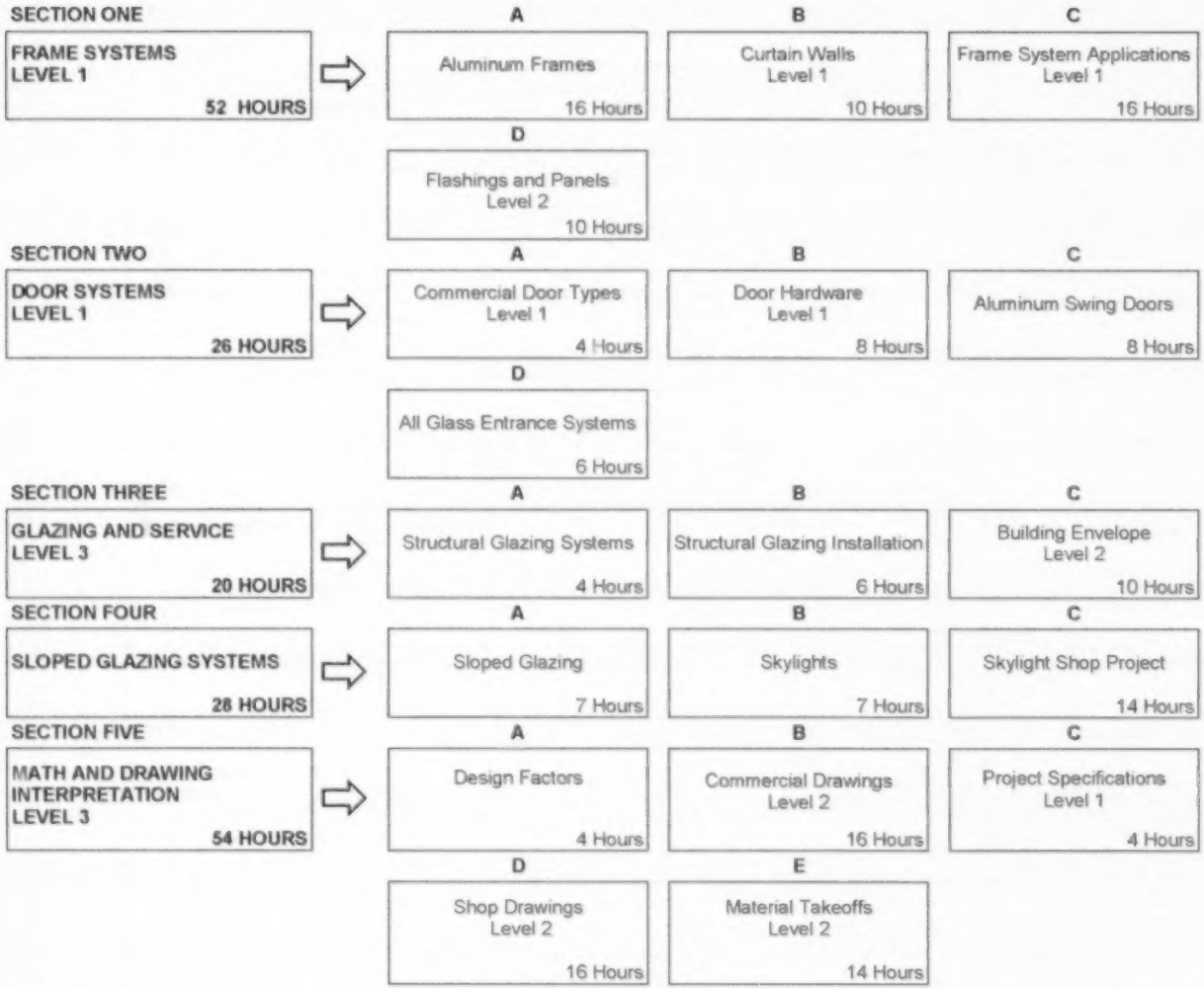
Glazier Training Profile
FIRST PERIOD
(6 Weeks 30 Hours per Week – Total of 180 Hours)



SECOND PERIOD
(6 Weeks 30 Hours per Week – Total of 180 Hours)



THIRD PERIOD
(6 Weeks 30 Hours per Week – Total of 180 Hours)



FOURTH PERIOD
(6 Weeks 30 Hours per Week – Total of 180 Hours)

SECTION ONE	**A**	**B**	**C**	
RED SEAL PROGRAMS AND SPECIALTY PRODUCTS **24 HOURS** ⇨	Interprovincial Standards Red Seal Program 2 Hours	Workplace Coaching Skills 2 Hours	Alberta's Industry Network 2 Hours	
	D	**E**	**F**	
	Barrier Free Entrances 4 Hours	Automatic Doors 6 Hours	Specialty Products 8 Hours	
SECTION TWO	**A**	**B**		
FRAME SYSTEMS LEVEL 2 **36 HOURS** ⇨	Curtain Walls Level 2 20 Hours	Frame Systems Applications Level 2 16 Hours		
SECTION THREE	**A**	**B**	**C**	
DOOR SYSTEMS LEVEL 2 **38 HOURS** ⇨	Commercial Door Types Level 2 8 Hours	Door Hardware Level 2 10 Hours	Storefront Frame/Door Shop Project 20 Hours	
SECTION FOUR	**A**	**B**	**C**	
GLAZING AND SERVICE LEVEL 4 **28 HOURS** ⇨	Specialty Glazing 6 Hours	Specialty Glazing Hardware 10 Hours	Building Envelope Level 3 12 Hours	
SECTION FIVE	**A**	**B**	**C**	
MATH AND DRAWING INTERPRETATION LEVEL 4 **54 HOURS** ⇨	Shop Drawings Level 3 14 Hours	Commercial Drawing Interpretation Level 3 14 Hours	Project Specifications Level 2 4 Hours	
	D	**B**		
	Estimating 18 Hours	Site Management 4 Hours		

NOTE: The hours stated are for guidance and should be adhered to as closely as possible. However, adjustments must be made for rate of apprentice learning, statutory holidays, registration and examinations for the training establishment and Apprenticeship and Industry Training.

FIRST PERIOD TECHNICAL TRAINING
GLAZIER TRADE
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:..... STANDARD WORKPLACE SAFETY ..... 20 HOURS

A. Safety Legislation, Regulations and Industry Policy in the Trades.....2 Hours

Outcome: ***Describe legislation, regulations and practices intended to ensure a safe work place in this trade.***

1. Demonstrate the ability to apply the Occupational Health and Safety Act, Regulation and Code.
2. Explain the role of the employer and employee with Occupational Health and Safety (OH&S) regulations, Worksite Hazardous Materials Information System (WHMIS), fire regulations, Workers Compensation Board regulations, and related advisory bodies and agencies.
3. Explain industry practices for hazard assessment and control procedures.
4. Describe the responsibilities of workers and employers to apply emergency procedures.
5. Describe positive tradesperson attitudes with respect to housekeeping, personal protective equipment and emergency procedures.
6. Describe the roles and responsibilities of employers and employees with respect to the selection and use of personal protective equipment (PPE).
7. Select, use and maintain appropriate PPE for worksite applications.

B. Climbing, Lifting, Rigging and Hoisting.....1 Hour

Outcome: ***Describe the use of personal protective equipment (PPE) and safe practices for climbing, lifting, rigging and hoisting in this trade.***

1. Select, use and maintain specialized PPE for climbing, lifting and load moving equipment.
2. Describe manual lifting procedures using correct body mechanics.
3. Describe rigging hardware and the safety factor associated with each item.
4. Select the correct equipment for rigging typical loads.
5. Describe hoisting and load moving procedures.

C. Hazardous Materials and Fire Protection.....1 Hour

Outcome: ***Describe the safety practices for hazardous materials and fire protection in this trade.***

1. Describe the roles, responsibilities, features and practices related to the Workplace Hazardous Materials Information System (WHMIS) program.
2. Describe the three key elements of WHMIS.
3. Describe handling, storing and transporting procedures when dealing with hazardous material.
4. Describe safe venting procedures when working with hazardous materials.
5. Describe fire hazards, classes, procedures and equipment related to fire protection.

D. Apprenticeship and Industry Training Orientation..... 2 Hours

Outcome: Describe the Alberta Apprenticeship training system.

1. Identify the training profile of the Glazier Apprenticeship in Alberta.
2. Explain the Glazier program course outline learning outcomes and objectives.
3. Discuss the contents of the apprenticeship training Record Book.
4. Describe the responsibilities for the Contract of Apprenticeship by the apprentice, employer and Alberta Apprenticeship and Industry Training.
5. Identify industrial, commercial and residential fields that provide opportunities for Glaziers.

E. Scaffolding and Access Equipment..... 4 Hours

Outcome: Describe the safety procedures of scaffolding and access equipment.

1. Describe general scaffold terms and components.
2. Identify scaffold systems and structures.
3. Describe tying and bracing scaffolds.
4. Describe base conditions for scaffolds.
5. Describe erection and dismantling of scaffolds.
6. Describe scaffolding and harness safety including maintenance and inspection.
7. Describe powered elevation work platforms.
8. Perform checklist procedures.

F. Swing Stage Scaffolding..... 10 Hours

Outcome: Operate a swing stage scaffold system.

1. Identify types of swing stage scaffold systems.
2. Describe the safety features of swing stage systems.
3. Describe types of fall arrest equipment used when operating a swing stage system.
4. Interpret safety codes and regulations related to swing stage systems.
5. Describe the swing stage inspection process.
6. Complete an inspection of a swing stage system.
7. Operate a swing stage scaffold system.

SECTION TWO:.....TOOLS AND CONSTRUCTION PRODUCTS.....19 HOURS

A. Hand Tools .....5 Hours

Outcome: Use and maintain hand tools.

1. Identify measurement and layout tools and their applications.
2. Identify squaring and marking tools and their applications.
3. Identify assembly and dismantling tools and their applications.
4. Describe maintenance procedures for hand tools.
5. Use hand tools used in the trade.

B. Portable Power Tools ..... 4 Hours

Outcome: Operate and maintain portable power tools.

1. Identify portable power saws and their applications.
2. Identify types of drills and their applications.
3. Identify specialty portable power tools and their applications.
4. Describe maintenance procedures for portable power tools.
5. Operate portable power tools used in the trade.

C. Stationary Power Tools ..... 4 Hours

Outcome: Operate and maintain stationary power tools.

1. Identify stationary saws and their applications.
2. Identify specialty types of stationary power tools and their applications.
3. Identify presses and their applications.
4. Identify edging machines and their applications.
5. Describe maintenance procedures for stationary power tools.
6. Operate stationary power tools used in the trade.

D. Fasteners, Adhesives and Sealants ..... 6 Hours

Outcome: Use fasteners, adhesives and sealants.

1. Identify the different types of fasteners and their applications.
2. Identify the different types of adhesives and their applications.
3. Identify the different types of sealants and their applications.

SECTION THREE: ..... GLASS AND GLASS FABRICATION LEVEL 1 ..... 34 HOURS

A. Glass Types ..... 3 Hours

Outcome: Recognize common types of glass.

1. Identify types of glass and their applications.
2. Describe the composition of different types of glass.
3. Identify the different sectors of the glass industry.

B. Glass Storage and Handling ..... 4 Hours

Outcome: Perform methods of glass storage and handling.

1. Describe glass handling procedures.
2. Describe the requirements of glass storage racks and their applications.
3. Outline the procedures for glass storage.
4. Describe the packaging of glass products.
5. Exercise different storage procedures for glass.

C. Glass Manufacturing ..... 3 Hours

Outcome: Describe the glass manufacturing process.

1. List materials used to manufacture glass.
2. Describe methods used to manufacture glass.

D. Glass Cutting and Edging ..... 24 Hours

Outcome: Perform cutting and edging of glass.

1. Identify tools and products used to cut glass.
2. Describe methods to cut glass.
3. Perform glass cutting techniques using various glass cutting tools.
4. Identify tools and products used to edge glass.
5. Describe methods used to edge glass.
6. Perform edge finishes on glass.

SECTION FOUR: .....GLAZING AND SERVICE LEVEL 1 ..... 18 HOURS

A. Glazing Tools ..... 3 Hours

Outcome: Operate and maintain glazing tools used in the trade.

1. Identify different types of glazing tools and their applications.
2. Operate glazing tools used in the trade.
3. Maintain glazing tools used in the trade.

B. Window Screens ..... 3 Hours

Outcome: Fabricate window screening products.

1. Identify the common types of products of window screen.
2. Describe the use of the types of products for window screens.
3. Fabricate a window screen.

C. Industry Codes and Standards ..... 4 Hours

Outcome: Use codes and standards pertaining to the glazing industry.

1. Identify the National Building Code (NBC) and Alberta Building Code (ABC) code books used in industry.
2. Describe the relationship between the national code book and the Alberta code book.
3. Identify the sections related to the glazier industry.

D. Auto Glass Level 1 ..... 4 Hours

Outcome: Describe automotive glass removal and installation procedures.

1. List the tools used to remove auto glass.
2. List the tools used to install auto glass.

3. Identify the types of glass used in the auto glass industry.
4. List the bonding agents used to install auto glass.
5. Identify the resource for glass codes related to the auto glass industry.
6. Outline the procedures for installing a front windshield.

E. Flat Glass ..... 4 Hours

Outcome: Service flat glass products.

1. Identify the flat glass products used in the industry.
2. Describe the uses of flat glass products.
3. Remove flat glass products.
4. Fabricate flat glass products.
5. Install flat glass products.

SECTION FIVE: ..... WINDOW SYSTEMS ..... 35 HOURS

A. Residential Window Systems ..... 10 Hours

Outcome: Install residential window systems.

1. Identify types of residential windows.
2. Identify the different materials used in residential windows.
3. Describe the methods of installation in different residential substrate construction.
4. Outline the procedure for repairing a residential window.

B. Commercial Window Systems ..... 25 Hours

Outcome: Fabricate and install a light commercial ribbon window system.

1. Identify types of commercial windows.
2. Identify the different materials used in commercial windows.
3. Identify the methods of storage and handling of metals.
4. Describe methods of installation in different commercial substrate construction.
5. Outline the procedures for repairing a light commercial window system.
6. Fabricate a light commercial ribbon window system.
7. Install a light commercial ribbon window system.

SECTION SIX: ..... MATH AND DRAWING INTERPRETATION LEVEL 1 ..... 54 HOURS

A. Math Fundamentals ..... 6 Hours

Outcome: Solve basic math problems.

1. Describe basic calculator functions and operations.
2. Perform basic math calculations using whole numbers, fractions and decimals.
3. Perform number and measurement conversions using whole numbers, fractions and decimals.

4. Convert measurements between metric and imperial.
5. Add, subtract, multiply and divide fractions.
6. Convert between fractions and decimals.

B. Ratio, Proportion and Percentage ..... 6 Hours

Outcome: Solve ratio, proportion and percentage problems.

1. Describe percentage calculations and their related trade applications.
2. Convert between decimal and percentage numbers.
3. Calculate the percentage value of a number.
4. Calculate the percentage value of one number relative to another.
5. Calculate the numeric value of a percentage.
6. Describe ratio and proportion and their related trade applications.
7. Solve ratio and proportion problems.

C. Glazing Material Calculations ..... 6 Hours

Outcome: Calculate quantities of glazing materials.

1. Calculate material quantities as related to the information found on plans and drawings.
2. Calculate edge tolerances to the appropriate system.
3. Determine the maximum yield of a sheet of glass.
4. Determine the yield of an aluminum extrusion.
5. Calculate the weight of a piece of glass.

D. Residential and Light Commercial Drawings ..... 26 Hours

Outcome: Interpret residential and light commercial drawings.

1. Identify the different components of a drawing.
2. Describe schedules and specifications.
3. Perform scaling and dimensioning tasks.
4. Locate the dimensions of windows and doors in drawings.

E. Orthographic and Isometric Drawings ..... 10 Hours

Outcome: Produce orthographic and isometric drawings.

1. Identify orthographic drawings.
2. Identify isometric drawings.
3. Draw orthographic drawings.
4. Draw isometric drawings.

SECOND PERIOD TECHNICAL TRAINING
GLAZIER TRADE
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:..... GLASS AND GLASS FABRICATION LEVEL 2 ..... 30 HOURS

A. Mirrors..... 4 Hours

Outcome: Perform the layout, fabrication and installation of mirrors.

1. Identify types of mirrors.
2. Outline the procedure for fabricating mirrors.
3. Fabricate a mirror.
4. Identify the hardware used for installing mirrors.
5. Describe procedures used for installing mirrors.
6. Install a mirror.

B. Specialty Glass and Applications ..... 4 Hours

Outcome: Recognize types of specialty glass and their applications.

1. Identify types of specialty glass.
2. Describe uses of specialty glass.
3. Identify locations where specialty glass is installed.
4. Identify the products used for installing specialty glass.
5. Discuss the various procedures for the installation of specialty glass.

C. Glass Cutting ..... 4 Hours

Outcome: Cut glass to various shapes.

1. Identify the different methods of glass cutting.
2. Identify the tools used to cut glass.
3. List procedures for cutting glass.
4. Cut different thicknesses of glass.
5. Cut glass free hand into various shapes.
6. Cut assigned glass projects.
7. Finish assigned glass projects.

D. Glass Fabrication..... 14 Hours

Outcome: Apply techniques for glass fabrication.

1. Describe uses of various abrasives, coolants and lubricants used to fabricate glass.
2. Describe the effects of speed and heat when drilling glass.
3. Drill holes in glass.

4. Use a glass saw to cut glass.
5. Remove scratches from glass using a scratch polishing machine.

E. Sandblasting, Etching and Films ..... 4 Hours

Outcome: ***Recognize the procedures for sandblasting, etching and film application on glass.***

1. Identify methods for sand blasting glass.
2. List the procedure for sand blasting glass.
3. Describe methods for etching glass.
4. List the procedure for etching glass.
5. Identify uses of glass film applications.
6. Identify methods for film application.
7. List the procedure for film application.

SECTION TWO: .....GLAZING AND SERVICE LEVEL 2..... 30 HOURS

A. Residential Glazing ..... 6 Hours

Outcome: ***Install and service residential glazing products.***

1. Identify sash types.
2. List procedures for sash preparation and glazing.
3. Describe installation techniques for a sash.
4. Prepare a sash and glaze.
5. Install a sash.
6. Identify types of frames.
7. List procedures for frame preparation and glazing.
8. Prepare a frame and glaze.
9. Install a frame.

B. Commercial Glazing ..... 10 Hours

Outcome: ***Describe service fundamentals for commercial glazing products.***

1. Identify glass types and sizes for servicing commercial glazing products.
2. Describe the theory of energy efficient glazing.
3. Describe methods for replacing glass.
4. Describe methods of securing glass.
5. Describe the purpose and use of spacer shims and setting blocks.

C. Store Front Glazing ..... 10 Hours

Outcome: ***Troubleshoot and repair store front entrance systems.***

1. Identify basic hardware and glazing used for store front entrance systems.
2. Troubleshoot store front entrance system malfunctions.

3. Develop a repair plan.
4. Resolve store front entrance system deficiencies.

D. Auto Glass Level 2 ..... 4 Hours

Outcome: ***Remove and install auxiliary auto glass.***

1. Identify types of auxiliary glass used in the auto glass industry.
2. List the tools used to remove and install auxiliary auto glass.
3. List sealing and bonding agents used to install auxiliary auto glass.
4. Interpret auxiliary glass codes and standards related to the auto glass industry.
5. Outline procedures for installing auxiliary glass.

SECTION THREE: .....CONSTRUCTION PRODUCT APPLICATION..... 26 HOURS

A. Glazing Compounds and Sealants..... 14 Hours

Outcome: ***Install glazing compounds and sealants.***

1. Outline types of glazing compounds and sealants.
2. Describe sealant application methods.
3. Install glazing compounds to wood and metal framing.
4. Caulk windows to substrates.

B. Building Envelope Level 1 ..... 12 Hours

Outcome: ***Describe the concept of building envelope science.***

1. Define building envelope.
2. Describe heat transfer and heat loss through building components.
3. Describe the function of air, vapour and weather barriers.
4. Describe building envelope applications.

SECTION FOUR: ..... FRAMES AND DOOR SYSTEMS ..... 40 HOURS

A. Introduction to Frame System Applications ..... 30 Hours

Outcome: ***Fabricate and install a commercial frame and door system.***

1. Identify the components of commercial aluminum frames.
2. Identify entrance systems.
3. Outline the preparation procedure for fabrication of aluminum frames.
4. Fabricate a frame and door system.
5. Outline the procedure for installing entrance door systems.
6. Install entrance doors including hardware and glazing.

B. Flashings and Panels Level 1 ..... 10 Hours

Outcome: ***Identify flashing and panels.***

1. Identify types of flashings and panels.
2. Describe applications of flashings and panels.
3. Identify the finishes for flashing and panels.

SECTION FIVE: ..... MATH AND DRAWING INTERPRETATION LEVEL 2 ..... 54 HOURS

A. Perimeter and Area ..... 12 Hours

Outcome: ***Perform perimeter and area calculations related to trade based problems.***

1. Calculate perimeters by applying the applicable formulas.
2. Calculate areas by applying the applicable formulas.
3. Solve surface area problems by applying the applicable formulas.
4. Calculate circumferences by applying the formulas for geometric shapes.

B. Shop Drawings Level 1 ..... 18 Hours

Outcome: ***Produce basic shop drawings.***

1. Describe line types used in orthographic drawings.
2. Demonstrate dimensioning methods and techniques.
3. Describe page layout and centering techniques.
4. Describe section, details and the use of material symbols.
5. Produce a basic shop drawing.

C. Commercial Drawings Level 1 ..... 18 Hours

Outcome: ***Perform drawing interpretation tasks relating to basic architectural drawings and specifications.***

1. Identify the different types of views in an architectural drawing.
2. Describe the difference between schedules and specifications.
3. Identify symbols and abbreviations.
4. Locate the dimensions of windows and doors in drawings.
5. Perform scaling and dimensioning tasks.

D. Material Takeoffs Level 1 ..... 6 Hours

Outcome: ***Determine basic material requirements to complete a job.***

1. Identify all materials required to complete a job.
2. Determine basic material quantities.
3. Generate a basic material list.

THIRD PERIOD TECHNICAL TRAINING
GLAZIER TRADE
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:..... FRAME SYSTEMS LEVEL 1 ..... 52 HOURS

A. Aluminum Frames..... 16 Hour

Outcome: ***Identify aluminum framing components including finishes, properties and extrusions.***

1. Outline the process of extruding aluminum.
2. Describe types of aluminum frame finishes and their applications.
3. Identify types of corrosion and corrosion prevention.
4. Identify types of aluminum framing components.

B. Curtain Walls Level 1..... 10 Hour

Outcome: ***Fabricate and Install a single level curtain wall.***

1. Describe types of curtain walls, anchors, reinforcing, structural requirements, expansion and sealing.
2. Describe a flush wall panel system and its application.
3. Identify curtain wall layout, survey and alignment.
4. Fabricate a single level curtain wall.
5. Install a single level curtain wall.

C. Frame System Applications Level 1 ..... 16 Hours

Outcome: ***Fabricate and install a basic frame system.***

1. Identify store front framing components.
2. Prepare store front framing.
3. Fabricate frames including transoms and side lights, using flush line material.
4. Install frames, glass and sealants.

D. Flashings and Panels Level 2..... 10 Hours

Outcome: ***Design and install flashings and panels.***

1. Interpret flashing and panel detail requirements.
2. Design flashings and panels to suit site conditions.
3. Fabricate flashings and panels.
4. Install flashings and panels.

SECTION TWO: ..... DOOR SYSTEMS LEVEL 1 ..... 26 HOURS

A. Commercial Door Types Level 1 ..... 4 Hours

Outcome: Describe commercial door systems.

1. List types of commercial door systems.
2. Identify components of commercial door systems.
3. Describe types of commercial door systems and their applications.

B. Door Hardware Level 1 ..... 8 Hours

Outcome: Describe associated door hardware.

1. Describe types of closers and their applications.
2. Describe types of hinging and their applications.
3. Describe types of locking mechanisms and their applications.
4. Describe associated hardware and their applications.

C. Aluminum Swing Doors ..... 8 Hours

Outcome: Install an aluminum swing door.

1. Identify the components of an aluminum swing door.
2. List the procedure for installing an aluminum swing door.
3. Install an aluminum swing door, door lite and hardware.

D. All Glass Entrance Systems ..... 6 Hours

Outcome: Install an all glass entrance system.

1. Identify different types of all glass entrance systems.
2. Describe the components of all glass entrance systems.
3. List the procedure for installing an all glass entrance system.
4. Install an all glass entrance system.

SECTION THREE: ..... GLAZING AND SERVICE LEVEL 3 ..... 20 HOURS

A. Structural Glazing Systems ..... 4 Hours

Outcome: Assess and repair a structural glazing system.

1. Describe structural glazing, its purpose and installation methods.
2. Identify basic component hardware operations.
3. Troubleshoot structural glazing system malfunctions.
4. Develop a repair plan.
5. Implement a repair plan.

B. Structural Glazing System Installation ..... 6 Hours

Outcome: Install a structural glazing system.

1. List the procedure for installing a total vision structural glazing system.
2. Establish an installation plan.
3. Install a total vision structural glazing system.

C. Building Envelope Level 2 ..... 10 Hours

Outcome: Install common types of building envelope components.

1. Describe types of building envelope components.
2. Describe types of membrane materials.
3. Identify issues related to membrane types.
4. List the procedure for installing membranes.
5. Install a membrane.

SECTION FOUR: ..... SLOPED GLAZING SYSTEMS ..... 28 HOURS

A. Sloped Glazing ..... 7 Hours

Outcome: Install and repair sloped glazing systems.

1. Identify special considerations concerning slope glazing.
2. Describe project specifications in conjunction with manufacturer's installation manuals.
3. Describe the anchoring requirements for sloped glazing.
4. Outline the procedure for sloped glazing installation.
5. Outline the procedure for sealing and providing drainage for sloped glazing.
6. Outline a troubleshooting and repair analysis for sloped glazing.

B. Skylights ..... 7 Hours

Outcome: Describe the installation and repair of skylights.

1. Identify different types of skylights.
2. Describe project specifications in conjunction with manufacturer's installation manuals.
3. Describe the anchoring requirements for skylights.
4. Outline the procedure for layout, glass installation and flashing to perform the function of skylight design.
5. Outline the procedure for sealing to provide drainage.
6. Outline the procedure to provide drainage.
7. Troubleshoot and repair skylights.

C. Skylight Shop Project ..... 14 Hours

Outcome: Install a skylight system.

1. Identify the components required to install a skylight system.
2. Outline the procedure for installing skylight systems.
3. Install a skylight including framing, glass and flashings.

SECTION FIVE: ..... MATH AND DRAWING INTERPRETATION LEVEL 3 ..... 54 HOURS

A. Design Factors ..... 4 Hours

Outcome: Use design factors when designing glazing systems.

1. Calculate design loads.
2. Define deflection.
3. Identify expansion and contraction factors of aluminum.
4. Define expansion joints as related to glazing systems.
5. Define a sleeve anchor.
6. Determine glass sizes according to design factors.

B. Commercial Drawings Level 2 ..... 16 Hours

Outcome: Interpret architectural and structural drawings.

1. Describe architectural and structural drawings.
2. Collect data from drawings.
3. Determine the conflicts within the data.

C. Project Specifications Level 1 ..... 4 Hours

Outcome: Interpret project specifications.

1. Review project specifications.
2. Collect data from specifications.
3. Determine if there are conflicts within the data.

D. Shop Drawings Level 2 ..... 16 Hours

Outcome: Produce a shop drawing.

1. Formulate a procedure for creating a shop drawing from collected data.
2. Create the paper layout.
3. Produce elevation and detail drawings.

E. Material Takeoffs Level 2 ..... 14 Hours

Outcome: ***Generate material takeoffs.***

1. Interpret material requirements from drawings.
2. List material types.
3. Determine quantities of each material type.
4. Apply material costs and calculate.

FOURTH PERIOD TECHNICAL TRAINING
GLAZIER TRADE
COURSE OUTLINE

UPON SUCCESSFUL COMPLETION OF THIS PROGRAM THE APPRENTICE SHOULD BE ABLE TO PERFORM THE FOLLOWING OUTCOMES AND OBJECTIVES.

SECTION ONE:..... RED SEAL PROGRAMS AND SPECIALTY PRODUCTS..... 24 HOURS

A. Interprovincial Standards Red Seal Program ..... 2 Hours

Outcome: ***Use Red Seal products to challenge an Interprovincial examination.***

1. Identify Red Seal products used to develop Interprovincial examinations.
2. Use Red Seal products to prepare for an Interprovincial examination.

B. Workplace Coaching Skills ..... 2 Hours

Outcome: ***Display coaching skills.***

1. Describe workplace coaching skills used for training apprentices.

C. Alberta's Industry Network ..... 2 Hours

Outcome: ***Describe the role of the Alberta Apprenticeship and Industry Training Board and the network of industry committees that represent the trades and occupations in Alberta.***

1. Describe Alberta's apprenticeship and industry training system.
2. Describe the roles and responsibilities of the Alberta Apprenticeship and Industry Training Board, government and post-secondary institutions.
3. Describe the roles and responsibilities of the Provincial Apprenticeship Committees, Local Apprenticeship Committees, and Occupational Committees.

D. Barrier Free Entrances ..... 4 Hours

Outcome: ***Assess barrier free entrance system operation.***

1. Describe types of barrier free entrance systems.
2. Interpret building codes and standards that pertain to barrier free entrance systems.
3. Describe barrier free entrance system controls.
4. Troubleshoot barrier free entrance system malfunctions.

E. Automatic Doors ..... 6 Hours

Outcome: ***Assess automatic door operations.***

1. Describe types of automatic doors.
2. Describe automatic door control systems.
3. Troubleshoot automatic door malfunctions.

F. Specialty Products ..... **8 Hours**

Outcome: ***Identify specialty products and emerging technologies in the glazing industry.***

1. Describe specialty glass types.
2. Identify specialized framing systems.
3. Describe electronic control systems.
4. Describe environmental control systems.
5. Describe specialty tools and equipment.
6. Describe special safety procedures and equipment.

SECTION TWO: ..... FRAME SYSTEMS LEVEL 2 ..... 36 HOURS

A. Curtain Walls Level 2 ..... **20 Hours**

Outcome: ***Install curtain wall systems.***

1. Identify types of curtain wall systems.
2. Demonstrate the considerations for rain screen principle on curtain walls.
3. Layout, fabricate and install a curtain wall frame.
4. Install a pair of doors with adapter.
5. Install a back pan and spandrel panel.

B. Frame System Applications Level 2 ..... **16 Hours**

Outcome: ***Fabricate and install a multi-level curtain wall.***

1. Describe multi-level curtain wall systems.
2. Identify project planning considerations for multi-level curtain wall systems.
3. Describe anchoring and expansion joint components.
4. Layout, fabricate and install a multi-level curtain wall frame.

SECTION THREE: ..... DOOR SYSTEMS LEVEL 2 ..... 38 HOURS

A. Commercial Door Types Level 2 ..... **8 Hours**

Outcome: ***Install specialty commercial doors.***

1. Describe interior and exterior commercial door system applications.
2. Describe layout and installation procedures for commercial door systems.
3. Install a commercial door system.

B. Door Hardware Level 2 ..... **10 Hours**

Outcome: ***Install and service specialty door hardware.***

1. Describe the installation of intermediate pivot hinges, butt hinges, continuous hinge, latch locks, electric strikes and service panic exit devices.
2. Describe service and repair procedures on door hardware.

C. Storefront Frame/ Door Shop Project ..... 20 Hours

Outcome: Fabricate and install a storefront frame system.

1. Layout the components of a swing door and frame.
2. Fabricate a door frame.
3. Install a door frame.
4. Install a door and hardware in the frame.

SECTION FOUR: .....GLAZING AND SERVICE LEVEL 4..... 28 HOURS

A. Specialty Glazing ..... 6 Hours

Outcome: Describe specialty glazing systems and their applications.

1. Outline multi-layered glass systems and their applications.
2. Outline glass balustrades and handrails.
3. Describe electronically altered glazing.
4. Describe point load supported glazing.
5. Describe the purpose of smoke baffles.

B. Specialty Glazing Hardware ..... 10 Hours

Outcome: Install specialty glazing systems.

1. Describe the installation of point support glazing systems.
2. Describe the installation of balustrade and handrail systems.
3. Describe the installation of suspended floor systems.
4. Describe emerging types of glazing systems and their hardware requirements.

C. Building Envelope Level 3 ..... 12 Hours

Outcome: Install a building envelope system.

1. Describe sequential building envelope installation procedures.
2. Interpret a drawing for a building envelope project.
3. Demonstrate the properties of an expansion joint within a building envelope.
4. Install perimeter seals.
5. Install finish flashings around the perimeter.
6. Describe tests used to determine building envelope integrity.

SECTION FIVE: ..... MATH AND DRAWING INTERPRETATION LEVEL 4 ..... 54 HOURS

A. Shop Drawings Level 3 ..... 14 Hours

Outcome: Generate a curtain wall shop drawing.

1. Design a curtain wall frame.
2. Formulate a procedure for creating a curtain wall shop drawing from collected data.

3. Create the paper layout.
4. Produce elevation and detail drawings.

B. Commercial Drawing Interpretation Level 3 ..... 14 Hours

Outcome: Interpret a commercial drawing.

1. Interpret a commercial architectural drawing.
2. Evaluate the data from the drawing.
3. Determine the conflicts within the data.
4. Organize the data into a materials list.

C. Project Specifications Level 2 ..... 4 Hours

Outcome: Interpret project specifications.

1. Interpret project specifications for a commercial drawing.
2. Evaluate the data from the project specifications.
3. Incorporate the specifications data into the materials list.

D. Estimating ..... 18 Hours

Outcome: Estimate labor and material quantities for a given project.

1. Use the materials list to create an estimate.
2. Calculate materials costs.
3. Calculate fabrication labour costs.
4. Calculate installation labour costs.
5. Calculate designated mark-up costs for the project.
6. Create a quote.

E. Site Management ..... 4 Hours

Outcome: Manage an on-site commercial project.

1. Review manpower allocation requirements.
2. Develop a project scheduling plan.
3. Identify site logistics requirements.
4. Develop a materials management plan.
5. Implement a safety management program.
6. Coordinate client/trades relationships.
7. Implement a project communications plan.
8. Develop a project cost control.
9. Describe a time management program.

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